# ECONOMIC ANALYSIS OF NAVY OWNERSHIP VS LEASING OF VEHICLES.

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# NAVAL POSTGRADUATE SCHOOL
## Monterey, California




# THESIS

ECONOMIC ANALYSIS OF NAVY OWNERSHIP
VERSUS
LEASING OF VEHICLES

by

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September 1977

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During recent years of austere Department of Defense funding coupled with rising costs, Congressional appropriations for procurement of administrative use motor vehicles, such as pickup trucks for the Navy, have fallen short of the amount required to replace older vehicles which have reached the end of their economic life. As a result, the Navy-owned vehicle fleets have continued to advance in average age and accumulated

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mileage, leading to increased operations and maintenance costs, excessive downtime and reduced vehicle availability. Vehicle leasing has been used in private industry as an alternative to ownership.

This thesis investigates the relative merits of the forms of leasing available to the Navy. The whole life cost of Navy ownership is quantified by analyzing transportation cost data from PWC San Francisco. This cost of ownership is then compared to the cost of leasing an equivalent fleet of vehicles under various forms of leasing. The alternative of leasing only a selected portion of the required vehicles while continuing to own and operate the remainder is analyzed. Finally, a current large scale leasing program at PWC San Diego is addressed to determine its effectiveness in actual practice.

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# ECONOMIC ANALYSIS OF NAVY OWNERSHIP VS LEASING OF VEHICLES

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## ABSTRACT

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# I. INTRODUCTION

The management and operation of ground transportation assets for the Department of Defense has always been a highly visible function, particularly for the United States Navy whose primary mission is to maintain control of the seas. Since World War II Congress has continually scrutinized the size and management of the administrative vehicle fleets maintained by the armed forces. The extent to which Congressional oversight reaches into the management of these assets is illustrated by the fact that there is a separate appropriation line item for procurement of transportation equipment and a specific limit on both the number and dollar value of sedans to be procured. Within the Navy, this appropriation is titled Other Procurement Navy(OPN). The scope of the OPN appropriation is very carefully and specifically stated by the Congress and subject to continual analysis and rejustification. OPN is an early target for review during cost reduction reviews. Through its control of the purse strings, Congress has in effect dictated management policy in this relatively minor area of the DOD budget, often times forcing diversions from written DOD policy on vehicle replacement, as well as occasional across the board reductions in vehicle allowances.

As a consequence of this Congressional interest, DOD in general and the Navy specifically, has instituted an aggressive program to improve the effectiveness and economy of operation of its administrative vehicle fleet. DOD policy guidelines are contained in DODINST 4500.28. These guidelines have been implemented within the Navy by OPNAV

P-44-2 as modified and detailed by the NAVFAC P-300, Management of Transportation Equipment. The primary objective of transportation management within the Navy, as directed by these governing documents, is to provide optimum utilization of available assets at the minimum possible cost. Maintenance is to be carried out at the minimum level necessary to insure safe, serviceable operation throughout the life expectancy of the assets.

By authority vested in it by instructions of the Secretary of the Navy, the Chief of Naval Operations, and Chief of Naval Material, the Naval Facilities Engineering Command(NAVFAC) has technical responsibility for administration, operation and procurement of transportation equipment within the Navy Department, except for the Marine Corps. To control the size and mix of the overall inventory of Navy transportation assets, NAVFAC has developed over the years a Table of Distribution and Allowances. This allowance is subdivided for each command within the Navy based upon approved justified requirements. Vehicle assets, whether Navy owned, rented, or leased, on hand at any command, may not exceed the approved allowance. Since allowances remain relatively constant, the primary justification for procurement of new vehicles to meet the existing requirements is to replace existing assets which are reaching the completion of their economic life. This economic life of transportation equipment is based upon chronological age or accumulated mileage. Excessive one-time repair cost, as established by NAVFAC P-300, may also constitute justification for replacement. For the majority of administrative use vehicles the economic lifetime defined in the governing directives is six years or 72,000 accumulated miles. Administrative use vehicles are "motor vehicles, normally of commercial design, assigned on the basis of formal authorizing documents, which are used to provide transportation support for an installation." To

further clarify this definition, a commercial design vehicle is one designed to meet civilian requirements and intended for general use in the transportation of personnel, equipment, supplies or other cargo. As one-half ton pickup trucks comprise the largest single percentage of administrative use vehicles in the Navy allowance, they will be used as the basis for this study. The DOD specified economic life of a one-half ton pickup truck is six years or 72,000 miles, as set forth by reference 1.

The military has traditionally satisfied its requirements for ground transportation through government ownership and maintenance of vehicle assets. The services endeavor to maintain the size of their vehicle fleets at allowance. Since vehicles are retained in inventory until a replacement is delivered, it follows that the average age of the fleet is a direct resultant of the procurement policy followed within the recent past.

Published procurement policy contained in Refs. 1 - 3 has indicated that any vehicle which exceeds the age or mileage criteria or whose required repair cost is above NAVFAC P-300 criteria will be programmed for replacement by a new vehicle. That programming is to be timed so that the vehicle is replaced at just about the time it reaches its replacement determining factor. This programming is accomplished for the Navy at the Inventory Control Point, Civil Engineering Support Office (CESO), Port Hueneme, California, as a result of data input from all Navy commands. CESO vehicle programming becomes an input source to the annual Navy budget submission. This programming is subjected to the budgetary review process and ultimately included in the OPN law.

Since age has historically been the determining factor, this implies that approximately one-sixth of the relatively

constant allowance should be replaced each year. This policy for rejuvenating the fleet of trucks is an important part of assuring its effectiveness and the achievement of planned operating and maintenance costs.

With a basic understanding of the DOD and service policies, the actual implementation of these policies can now be examined. In order for the Navy to have met the implied buy size dictated by policy, one-sixth of the allowance shown for each respective year in Figure 1 should have been procured. For example, for FY78 the procurement budget should have included enough money to buy approximately 1425 one-half ton pickup trucks at about $4,350 each for a total of approximately $6,200,000. Reference to Figure 1 indicates the disparity between what was planned (policy) and what actually happened.

Navy-wide Allowances and Replacements of One-half Ton Pick-up Trucks by Fiscal Year

| FY | ALLOWANCE | NUMBER PROCURED | PROPORTION OF FY'S ALLOWANCE PROCURED |
|---|---|---|---|
| 75 | 9351 | 2050 | 1/4.56 |
| 76 | 8888 | 1759 | 1/5.05 |
| 7T & 77 | 8457 | 1221 | 1/6.93 |
| 78 | 8554 | 1185 | 1/7.22 |

Source: CESO, Port Hueneme, Ca.

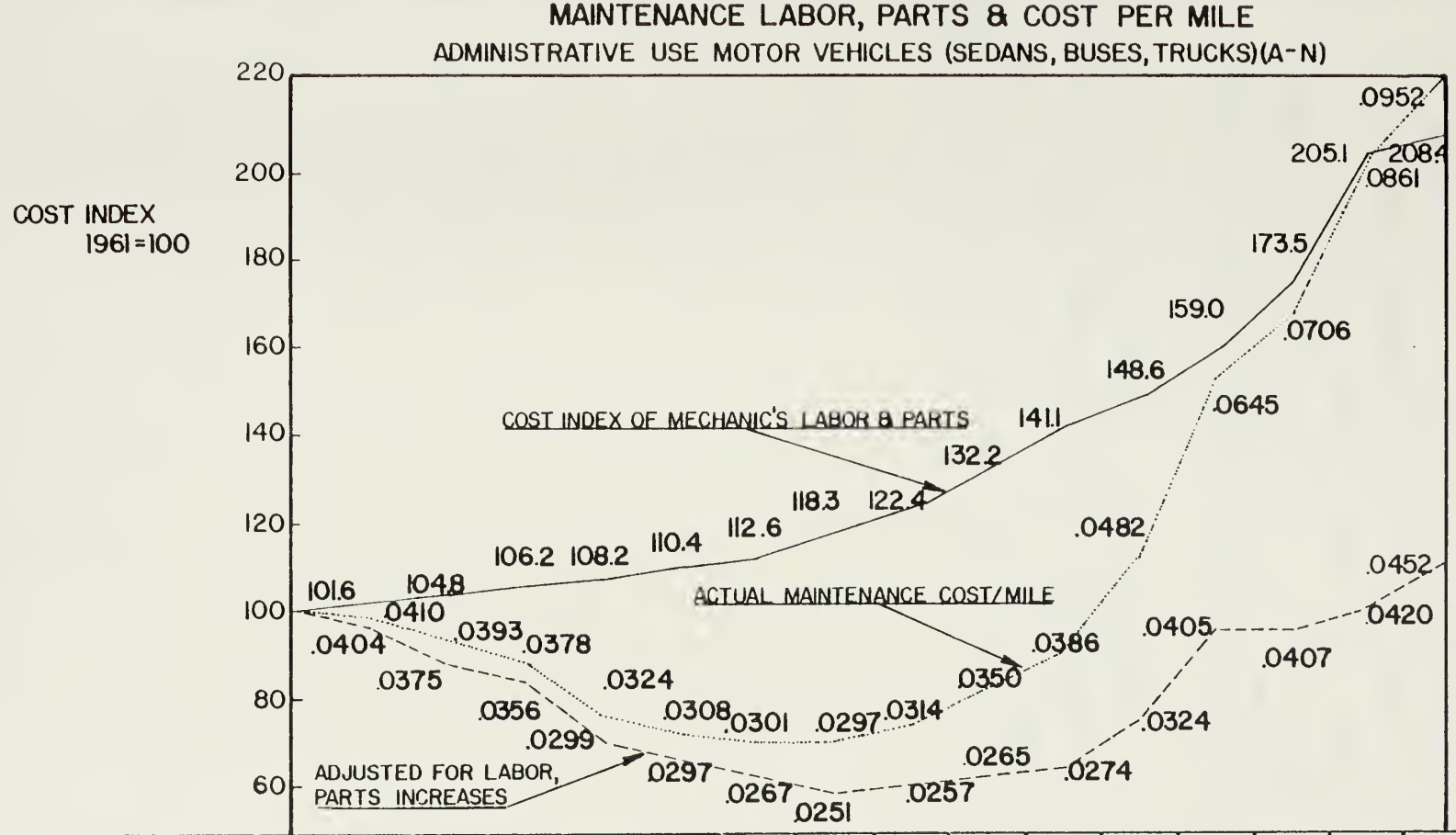
Figure 1 - NAVY-WIDE ALLOWANCES AND REPLACEMENTS OF ONE-HALF TON PICKUP TRUCKS BY FISCAL YEAR

These low quantity Navy buys will drive the overall vehicle fleet average age and mileage up. This in turn forces the total fleet's operating and maintenance costs above what is planned for a fleet of trucks with lower average age. This cause and effect relationship is graphically displayed by Figure 2. The years in which vehicles were replaced in a timely manner as established by Reference 1 reflect much lower operations costs. The 1965-1970 Vietman era funding reflects a healthy vehicle replacement cycle with a resultant lowering of the operating costs per mile. The standard against which actual fleet averages should be compared is the policy implied targets of three years or 36,000 miles developed by taking the average of the DOD 6 year/72,000 mile criteria, Reference 1.

Figure 2, developed from Naval Facilities Engineering Command transportation cost reports, shows the average age of the Navy's administrative use vehicle fleet as well as the cost of transportation operations over the past 15 years. Since approximately 85% of the vehicles upon which Figure 2 is based have life expectancies of six years/72,000, Figure 2 provides a close estimate of the Navy pickup truck fleet's average age/cost of operations profile.

As can be deduced from Figure 2, the Navy's one-half ton pickup fleet has for several years been above the three year standard. The implications of an overage fleet are the unnecessary outlay of greater amounts of funds for maintenance and operation than required for the standard or target age fleet.

# NAVY WIDE VEHICLE MAINTENANCE COST TRENDS AND GOALS




| FISCAL YEAR | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COST PER MILE ($) | 0423 | 0410 | 0393 | 0378 | 0324 | 0308 | 0301 | 0297 | 0314 | 0350 | 0386 | 0482 | 0645 | 0706 | 0861 | 0952 |
| AVERAGE AGE (YRS) | 6.7 | 6.9 | 6.2 | 5.3 | 4.6 | 4.1 | 3.7 | 3.4 | 4.4 | 5.1 | 5.5 | 6.0 | 6.6 | 6.7 | 6.7 | 6.8 |

FIGURE 2- NAVY WIDE VEHICLE MAINTENANCE COST TRENDS AND GOAL

The Navy has been plagued by a history of scarce funding followed by a strong catch-up effort, as evidenced by Figure 2. This vacillating approach has the detrimental effect of increasing the fleet age profile above that resulting from strict adherence to policy. This in turn leads to an obvious erosion in effectiveness, and maintenance and operating costs in excess of those anticipated by policy.

This history of limiting appropriations for vehicle procurement has been "penny-wise but dollar-foolish" as the funds going down the drain in excess operations and maintenance costs, Figure 2, exceed those saved by limiting procurement of new assets, Figure 1.

## II. LEASE VERSUS BUY

One major alternative to DOD ownership of transportation assets is leasing. Long term leasing, normally for periods of two years or longer, should not be confused with rental which is normally for a much shorter period of time at a higher daily rate and is used to satisfy a short term requirement. The question of whether to lease or buy any particular asset has been debated continually in the recent past. In private industry, leasing is a widely used method of securing the use of important assets. However, in private industry, leasing is made more attractive by tax differences between leasing, in which all outlays are considered expenses, and owning in which only a portion of the cost of the equipment can be expensed in any given year in the form of depreciation.

The following is a summary of the advantages of leasing.

1. No capital investment.

2. Vehicle costs can be better estimated for budgeting purposes.

3. Maintenance of operating records and reports is eliminated.

4. Flexibility is enhanced by the ability to lease additional vehicles to meet peak requirements.

5. Large reductions in overhead administrative costs can be realized.

6. Vehicles are automatically replaced at stated intervals with new equipment.

7. The headaches of procurement and disposal of vehicles are left to the lessor.

8. In leases which provide for contract maintenance, cost reductions can be realized in maintenance facilities, personnel and record keeping. Furthermore, in this form of lease, the contractor generally must provide a replacement vehicle for any vehicle which will be down for an

extended period of time.

The following is a summary of the advantages of ownership.

1. Mission requirements are considered to be met if the allowance is adequate and filled.

2. Pride of ownership may result in better vehicle care.

3. Short term price increases are generally avoided.

4. Military maintenance and service can be provided 24 hours a day, 7 days a week.

5. Navy owned vehicles can be transferred to another location based upon need with a minimum of delay.

The OPN appropriation funding structure has tended to mask the total cost of ground transportation from the military manager. The purchase cost of a vehicle under the ownership option is borne by a procurement appropriation, while the cost of operating and maintaining the vehicle fleet is borne by the Operations and Maintenance appropriation(O and MN). The military manager tends to address only the O and MN side of the cost picture and not to consider the initial costs incurred in procurement by OPN nor the salvage value dollars returned to the Government upon disposal of the vehicle. It should be noted that austere funding in the procurement appropriations over the past six to eight years has forced the sharp increase in the average age of the Navy's vehicle fleet with the resultant sharp increase in operation and maintenance cost, as graphically displayed by Figure 2.

## III. VEHICLE LEASING FROM GSA

### A. BACKGROUND

The armed services have been under close scrutiny in the cost area of their vehicle programs for several years. In the post-war years of the late 1940's and the early 1950's, Congress became an ever increasing force in criticism of vehicle costs. The initial reaction in the military services brought about a noticeable increase in the proportion of commercial design vehicles replacing the former more expensive military design type. Aggressive programs were also initiated at the local level and district level which largely included policies adopted from the techniques of commercial fleet-owners.

In spite of these efforts, officials were still not satisfied with the price tag on military ground transportation. As congressional interest reached its peak in 1952, President Eisenhower prescribed a cure-all in the form of government interagency motor pools. His directive, Executive Order 10579, officially put the General Services Administration (GSA) in the vehicle business.

The military was not overly enthusiastic about turning over ownership responsibilities to GSA and the idea of leasing any vehicles represented a whole new approach to DOD vehicle requirements. The entire question of vehicle leasing versus buying has been studied and debated by the armed services and the Congress for years, reaching the

conclusion that the present system was effective because the activities and organizations have the vehicles they need when they need them.

Efficiency is another matter. Providing the necessary effectiveness for mission requirements at the lowest cost was a more difficult question to resolve.

Leasing vehicles from GSA is another method for the military to satisfy their vehicle requirements. Therefore, GSA leasing practices and procedures will now be examined in this thesis.

## B. DEFINITIONS OF GSA LEASE TERMS

Base Flat Rate. This rate is intended to recover depreciation, fixed, and overhead expenses on a per-vehicle basis. It is computed on a monthly basis with the daily rate five percent of the monthly rate.

Depreciation. Prerequisite to accurate formulation of vehicle rental rates is a realistic estimate of monthly depreciation. The accuracy of the depreciation rate depends upon realistic salvage values based on the estimated useful life for each vehicle class. The formula to be used is:

$$\frac{\text{Delivered vehicle cost less salvage value}}{\text{Estimated vehicle life in months}} = \text{Monthly depreciation}$$

Example of monthly depreciation:

| | |
|---|---|
| Average capitalized value | $5,000 |
| Less salvage value (Est. at 20%) | 1,000 |
| Amount to depreciate | $4,000 |

Average life: 72 months

Monthly depreciation: $4,000/72 = $55.56

When computing monthly rates, the depreciation should be calculated using the depreciation formula even though the computer computes on a time or mileage basis whichever is greater.

Fixed and Overhead Costs. The costs are computed on an average class cost per month. The primary source of information is GSA form FS-264, Monthly Cost/Use report which reports vehicle years, fixed and overhead expenses by vehicle class. To compute, it is necessary to convert vehicle years to vehicle months and divide total of the fixed and overhead expenses by the vehicle months of operation.

Example: Class 41 - vehicle years 2,263.5/ month; fixed costs $277,368/ year; overhead costs $465,898/ year.

2,263.5 x 12 = 27,162.0 vehicle months

$277,368 + $465,898 = $743,266

27,162 = $27.36 x1.10 (inflation) = $30.10 per month.

Base Flat Rate Charge

| | |
|---|---|
| Depreciation expense | $55.56 |
| Fixed and Overhead | 30.10 |
| Total | $85.66 *($86.00)/mo. |

*Round to next higher dollar.

The daily rental rate is applied at five percent of the established monthly rate.

Mileage Charge. The mileage charge is the total of expense items (these items shown in the example below) related to the miles operated. Primary source of the information is the FS-264, Monthly Cost/Use Report, which identifies by vehicle class the total miles operated and total cost of direct labor, parts and supplies, contractual services for vehicle repair and maintenance, tires and tubes, petroleum products, service station services, and net vehicle accidents damage. For light trucks the cost of operating these vehicles is so close within the class that GSA has set a precedent by establishing the same mileage rate within the class.

Example:

| | |
|---|---|
| Miles Operated | 3,937,753 |
| Direct Labor | $13,662 |
| Parts and Supplies | 9,532 |
| Contractual Services | 34,251 |
| Tires and Tubes | 18,149 |
| Net Accident Damage | (972) |
| Petroleum Products | 170,961 |
| Service Station Services | 8 |
| Total Direct Costs | $245,591 |

Direct cost per mile = $0.0623 x 1.10 (inflation)
= 0.0685 = $0.070 *

*Rounded.

## C. GSA POLICY

GSA leases its vehicles for a monthly rate that is a combination of a flat rate plus a charge per mile, which is designed to recover all costs over the vehicle's life. GSA policy sets this at six years or 60,000 miles with an estimated 20% salvage value. However, the short-falls in Congressional appropriations in the last few years have forced replacements at the seven years or 70,000 mile point on the average. Salvage values have been higher than expected, running as high as 40% lately. This study uses a 20% salvage value for economic analysis.

GSA rates provide for all costs normally encountered by the user, i.e., gasoline, oil, lubricants, tires, minor maintenance and repairs. Also included are indirect expenses, i.e., depreciation, fixed equipment, office space, comptroller services and administration.

If procurement costs escalate gradually, the fixed flat rate can be expected to take only a minimal increase. The cost per mile rate varies with geographic area, prevailing labor rates, etc. and is subject to increase as GSA's costs rose.

## D. GSA BILLING PROCEDURES

The GSA contract provides for a monthly billing of all customers. There are no administrative records which are required to be maintained by the customer, but GSA has one required form which the operator must prepare on the last

day of each month. These forms (GSA Form 494) are largely preprinted by GSA and require the user to fill in the ending vehicle odometer mileage and date. These are forwarded to GSA together with the credit card receipts for the vehicle during the month and becomes the basis for billing.

## E. GSA SERVICE PROCEDURES

The GSA lease agreement operates on a credit card system. All gasoline, oil, lubrication, washing, anti-freeze, tire repairs, battery charging, mounting and dismounting of snow tires or chains, and emergency replacement of spark plugs, fan and generator belts, windshield wiper arms and blades, and lamps are authorized services to be charged by the customer in behalf of GSA. Non-authorized charges include storage, parking, major repairs, and purchase of tires, tubes and batteries. In using the credit card it is the responsibility of the user to obtain supplies and services needed to maintain their vehicles at the lowest overall cost (price and other factors considered) to the government. The Navy would not be performing any maintenance or routine inspections on GSA vehicles.

Tires and batteries are not authorized to be purchased by the customer under the GSA lease agreement. It is felt that neither tires nor batteries suffer complete failure beyond repair except in rare instances. As a result, when replacement of either is anticipated, the GSA office would be notified and a replacement item sent to the customer. All other parts or repairs costing less than $50 may be made at the discretion of the operator.

The GSA vehicle pool is normally the point where intermediate level maintenance is performed. Heavy maintenance is contracted to commercial facilities. GSA will establish a maintenance point wherever there is a large concentration of customers.

It should be emphasized that GSA rental charges include the cost of gasoline and oil, while commercial full service leases generally do not.

## F. GSA REPLACEMENT CRITERIA

Any vehicle which is anticipated to be out of use for over three days will be replaced by GSA. It is GSA policy to provide immediate replacement if available from the pool, when a customer turns in a vehicle for maintenance or repairs. The larger the concentration of customers, the greater the probability of having a replacement available in the pool.

## G. GSA ACCIDENT POLICY

As with Navy vehicles, accident claims against GSA are claims against the government and commercial insurance is not carried. The accident forms which must be filed (Standard Form 91, Standard Form 94) are identical to those required of Navy vehicle accidents. The Navy is required to reimburse GSA for damages resulting from gross negligence or willful misconduct.

## H. COST OF VEHICLES

As stated earlier, the charges made for GSA vehicles are in terms of a fixed rate per month plus a mileage charge. The one-half ton pickup flat rate is $47 per month and the mileage rate is $.09 a mile, Reference 4.

# IV. VEHICLE LEASING FROM COMMERCIAL SOURCES

## A. BACKGROUND

Government leasing from commercial sources is not a new or unique concept. For many years now, the Government has leased such items as computers, office machines, and local communications systems. As yet, the Government leasing of motor vehicles from commercial fleet sources has not received much wide attention. In the past a few sedans were leased for flag officers. Some specialized vehicles are presently leased for recruiters but on the whole, commercial leasing has been a rare event.

Commercial transportation leasing firms are currently among the "golden haired" boys of the business world. The Wall Street Journal and other publications that reach key financial decision-makers include large advertisements regarding vehicle leasing. At present, more than 20% of all cars are leased, Reference 6. Most corporate leasing firms are now experiencing an annual growth rate of 10-15 percent, and the optimism surrounding the vehicle leasing industry is not unlike the feeling toward the computer industry of 5-7 years past. Top auto industry executives believe 40 to 50% of all new cars built by 1985 will be leased, Reference 6. Many writers on the subject of commercial vehicle leasing approach the topic as a sign of progressive management, citing that modern day executives find leasing an integral part of the total transportation program.

Vehicle leasing has not always enjoyed such widespread popularity, however. For example, Hertz made its start in the rental-leasing industry from a backstreet garage in Chicago. It seemed that throughout the 1920's it was most unfashionable to operate a vehicle other than one's own, so potential Hertz customers would nervously slink to the far side of town to rent their "very own" Model T.

It was not until the early World War II years that this back-street image began to change. With the sprawling airports then being built, most rental/leasing companies soon relocated to take advantage of the new growing market. Along with this growth came the rapid entry of new firms. The size of the fleet leasing industry becomes readily apparent when one skims the classified pages of any telephone directory. For example, the Monterey, California "Yellow Pages" under "Truck Renting and Leasing" lists no less than 16 firms in the vehicle leasing business.

In addition to the leading companies in the field, one finds new car dealers, finance companies, and many other businesses affiliated with the automobile industry active in vehicle leasing. Admittedly, many of these businesses operate with comparatively little capital investment.

## B. COMMERCIAL LEASING COMPANIES

There are basically three types of vehicle leasing companies.

1. The dealer-oriented firm, which usually handles vehicle leasing as a side-line with vehicle sales. This source may be favored for considerations of personal recognition or ease of

service in the local area.

2. The manufacturer-controlled company, such as the Ford Authorized Leasing Service and the Chrysler Leasing system.

3. The independent lessors, who handle the bulk of commercial leasing and are led by such firms as Hertz, Avis, and Ryder. The independent firms are considered strong on service - the real distinction between the three types, Reference 6.

## C. TYPES OF LEASE AGREEMENTS

There are three major types of commercial lease agreements. Of these, the full service maintenance lease appears to be the most popular. Under this agreement the lessor includes the cost of all tires, batteries, maintenance, and other normal expenses in the monthly charge. The lessee must then furnish his own gasoline and oil. The major difference between a commerical lease and a GSA lease is that GSA includes gasoline and oil as a standard item of the lease contract whereas commercial leases do not.

The second type is termed the net lease which is usually written for the same time period as the full service maintenance, and is the least expensive of the three. Under this type, the vehicle is supplied by the lessor but all the services and maintenance must be provided by the user. Approximately 8 percent of all commercial leases currently fall into this category.

The special full service maintenance lease is the third

type and is the most expensive. In this instance, the lessee only provides the driver. Normally under this type of contract, the vehicle is returned to the point of pick-up daily for storage, gasoline, and service. This form of leasing is usually short-term in nature and comes closest to approximating vehicle rental. As the latter type of lease agreement appears to have obvious disadvantages in terms of Government requirements, only the full service maintenance lease and the net lease with Government maintenance will be discussed hereafter.

## D. GOVERNMENT POLICY REGARDING LEASING

In order for an activity to lease vehicles, the activity must initiate a request, with justification, through the chain of command in accordance with DOD and GSA policy as set forth by references 1 - 4. If an activity wishes to lease vehicles, it cannot exceed its existing vehicle allowances as set forth in the Vehicle Allowance Listing, known more commonly as the allowance. The approved numbers within the vehicle allowances must not be exceeded, either in total or within any vehicle category code. Changes in the vehicle allowances is a separate subject and will not be addressed in this study. A substitution of lease allowances for Government allowances is made on a one for one basis. The activity requesting the lease is responsible for funding all lease costs.

## E. TYPICAL GOVERNMENT LEASE SPECIFICATIONS FOR 1/2 TON PICKUP TRUCKS

A typical government lease contract (Reference 7)

specifies that the contractor shall furnish American manufactured, 1/2 ton, 4 x 2 (4 x 4 if four wheel drive is required) pickup trucks, with the following provisions and standard equipment:

1. Current model year, used vehicles are not acceptable.
2. Painted manufacturer's standard light (or pastel) colors.
3. Rear bumper.
4. Spare wheel and mounting rack.
5. Right and left outside rear view mirrors.
6. Hearer, defroster, directional signals, windshield washer and seat belts.
7. Automatic transmission. (The cost is very low to the lessor to include automatic transmission because of higher resale value of the vehicle plus virtually no maintenance other than factory warranty during the first 24 months).

Additional government lease provisions may include :

1. Heavy duty alternator - minimum 50 amp output.
2. Heavy duty cooling system with overflow coolant recovery system.
3. The provision that all vehicles shall meet or exceed the current California vehicle pollution control requirement.
4. Six passenger crew cab.
5. Drip rails over left and right doors.

In the past, additional equipment or substitution of 3/4 ton pickup trucks were allowed to be furnished at the Contractor's option at no additional cost to the Government. However, with the recent emphasis on energy conservation, this clause is now being deleted from some vehicle leasing contracts. Further, a V-8 with automatic transmission cannot be substituted by the contractor for a six cylinder with manual transmission.

## F. IDENTIFICATION AND LICENSING

The Government provides special identification for all vehicles furnished under the lease which is displayed in lieu of State license plates. Generally this is followed by a disclaimer to the effect, "It remains the Contractor's responsibility to register/license the vehicles in accordance with the requirements of the State of California."

## G. VEHICLE MAINTENANCE PROVISIONS

The maintenance of the pickup trucks may be performed either by the Government or the Contractor.

Under government maintenance, the Government provides all service, materials and labor necessary to maintain each motor vehicle in accordance with high standards of automotive maintenance, and in a safe, dependable and lawful operating condition, including but not limited to repairs, maintenance, tire and tube repair and replacements, adjustments, gasoline, oil, washing, parking space, and servicing of the vehicles. The Government shall establish a maintenance schedule to conform to the manufacturer's recommended maintenance schedule.

Under contractor maintenance, the contractor provides all service, materials, and labor necessary to maintain each vehicle in accordance with high standards of automotive maintenance, and in a safe, dependable and lawful operating condition, including but not limited to repairs,

maintenance, tire repair and replacement, adjustments, oil changes, lubrication and servicing of or to the vehicles, including anti-freeze. (Gasoline and added oil will be furnished by the Government).

Vehicles leased under a contractor maintenance contract will be made available to the Contractor for routine scheduled maintenance after normal working hours, and at any time on Saturday, Sunday or Federally observed holidays. Vehicles are made available to the Contractor for servicing in specified quantities at locations convient to the Government.

The concept being that the Contractor perform all routine service/maintenance after normal working hours. Should the Contractor elect to service the vehicles during normal working hours, he must furnish a suitable substitute vehicle prior to taking any vehicle out of service.

The Government seeks to further protect itself against the loss of an operational vehicle by specifing that the Contractor shall furnish substitute equipment in the event of breakdown or collision, causing the vehicle to be out of service for one (1) consecutive day or more for maintenance or repairs. The Contractor shall furnish a comparable replacement vehicle at no cost to the Government. In the event the Contractor is unable or unwilling to furnish a suitable replacement vehicle, his billing invoice for that month shall reflect a deductible amount of $10.00 per vehicle, each day, after the first 24 hours that the vehicle is cut of service.

## H. VEHICLE WARRANTY

Regardless of which party performs the maintenance function, all vehicles are specified to be fully covered by the manufacturer's standard new vehicle warranty. The Contractor is specifically assigned the responsibility for compliance with the warranty. In order to cause no delay to the Government and to assure prompt warranty compliance, a substitute vehicle or a deductive amount is specified during periods of warranty repairs exceeding 24 hours. The warranty clause of Reference 7 provides: "The Contractor shall be responsible for all warranty work as provided in the manufacturers standard new vehicle warranty. In the event any vehicle is out of service for two consecutive days or more for warranty work, the Contractor shall furnish a similar replacement vehicle at no cost to the Government. In the event the Contractor is unable or unwilling to furnish a suitable replacement vehicle, his billing invoice for that month shall reflect a deductive amount of $10.00 each vehicle, each day, after the first 24 hours that the vehicle is out of service. The vehicle shall be considered out of service when not in the Government's possession in a safe, operable condition, suitable for its intended use."

## I. LENGTH OF LEASE

Generally the period of the lease is 24 months with an option for a 12 month extension by the Government at the same rate. Experience at four sites in the Twelth Naval District by the Western Division, Naval Facilities Engineering Command indicates that this option is rarely

exercised. This seems an ideal time frame, with the Government receiving new vehicles, using them 2 years with much lower maintenance costs and down-time than older vehicles and then the Contractor is able to resell the vehicles with a rather high salvage value, sometimes at nearly the same fleet rates he initially purchased the vehicles from the manufacturer.

## J. VEHICLE QUANTITIES

The number and type of vehicles is specified in the contract. Additionally, there is normally a provision whereby the Government may increase this number up to a specified percentage within a short period following award of the contract. Examples are: "The Government has an option to increase the number of vehicles by 15% within 180 days of the award," or "20% within 120 days of award," Reference 7.

## K. CREDIT CARDS

Credit cards or similar means of identification will be furnished by the Contractor with each vehicle so that emergency service can be obtained wherever the vehicles are located at the time service is required. Additionally, the Contractor furnishes with each vehicle a packet containing detailed information and procedures for obtaining emergency service or replacement of tires, batteries, etc., not covered by credit cards. The packet also contains complete instructions for reporting to the Contractor or his designated insurance company, concerning accidents in which the vehicle may be involved. One packet containing the

above described documents and instructions is also furnished to the Contracting Officer.

## L. VEHICLE LEASING COSTS

Leasing costs were developed from four current contracts leasing 75 pickup trucks by the U. S. Navy in the 12th Naval District. A fifth contract is being prepared for advertisement for bids which will provide 15 pickups for the inspection force of the Officer in Charge of Construction, Elk Hills, Tupman, Ca. Based upon the data available from these five contracts, the costs for leasing by the Government of one-half ton pickup trucks in California with Government maintenance is estimated to be approximately $105 per month per vehicle. This figure was derived from the PWC San Diego contract cost for the past four years of approximately $104 per month per vehicle. Figure 3 provides detailed information regarding the costs of current Government vehicle lease contracts in the Twelth Naval District.

| GOVERNMENT VEHICLE LEASING COSTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| LOCATION | PICKUP TRUCK w/add'l provisions | NUMBER | PERIOD month | MAINT. BY | ESTIMATED FLEET AVG. mi/veh/mo | LOW BID veh/mo | RATE/MI FOR EXCESS AVG. FLEET MILEAGE |
| PWC San Diego | ½ ton,auto trans, heavy duty alt. & cooling system | 34 | 24 | GOV | 2,400 | $104.15 | $ .01 |
| NAD Hawthorne,Na | ½ ton,auto trans, heavy duty alt. | 15 | 12 | GOV | 1,500 | $109.00 | NA |
| NTS Keyport, Wa | 3/4 ton, auto transmission | 10 | 12 | CON | 1,200 | $128.50 | $ .054 |
| OICC TRIDENT Bremerton | 3/4 ton,auto trans,6 pass. crew cab | 1 | 24 | CON | 600 | $158.60 | $ -0- |
| | 3/4 ton 4x4 | 1 | 24 | CON | 600 | $158.60 | $ -0- |
| | ¼ ton 4x4 with top | 14 | 24 | CON | 600 | $160.40 | $ -0- |

Figure 3 - GOVERNMENT VEHICLE LEASING COSTS

# V. ECONOMIC ANALYSIS OF THE ALTERNATIVES

This thesis has, to this point, provided a discussion of the relative merits of ownership as opposed to GSA and commercial leasing and the policies pertaining to each. This chapter will undertake an economic analysis of these alternatives in order to determine which method of providing vehicles will meet the Navy's transportation requirements at the lowest possible cost.

## A. GENERAL ASSUMPTIONS

In order to evaluate the total cost of providing suitable transportation under each of the alternatives and to provide a means of comparison, the following general assumptions are made which apply to all alternatives.

1. Each alternative must provide a minimum of 25 one-half ton standard pickup trucks available in operating condition at all times.

2. Each alternative will be assumed to operate an equivalent total number of miles. In view of the replacement provisions of GSA leasing and full service maintenance leasing, only 25 vehicles must be leased under these options. In view of the downtime associated with government furnished maintenance, additional vehicles must be obtained by the Navy under the ownership and lease with government maintenance options in order to provide 25 vehicles in a ready status. Since fewer trucks need to be leased than bought to provide 25 vehicles in a ready status, per unit annual mileage will differ between alternatives.

3. Any truck in operating condition, regardless of age or accumulated mileage, has equal utility.

4. Effects of inflation tend to affect all alternatives equally and are therefore disregarded.

5. Fixed overhead costs are extremely difficult to identify and therefore will not be considered in this analysis. Probable relative overhead

changes will be discussed for alternatives with closely comparable costs.

6. The delay between vehicle breakdown and the actual time the vehicle is delivered to the maintenance shop is approximately equal for all alternatives.

7. The net present value (NPV) of cash flows will be calculated for each alternative and will be the basis for final comparison. Present value is given by the formula

$$NPV = PMT\ (1+i)^{n}$$

where i is the discount rate and n is the number of years in the future. The cost of government capital which will be used for discounting any future cash flows is 10%.

8. Since current practice indicates that the economic life of a government owned vehicle is approximately seven years instead of six years prescribed by the services, the time to be covered by each alternative will be seven years.

9. Attrition due to accidents will affect each alternative equally and will therefore be disregarded.

## B. NET PRESENT VALUE OF THE COST OF NAVY OWNERSHIP

The total cost to the Navy of ownership of its vehicle fleet consists of the initial capital expenditure, including the procurement cost less the discounted salvage value, and the annual costs associated with operation and maintenance.

The expected purchase price for a one-half ton standard pickup truck for FY78 of $4346 will be used for the purposes of this analysis. Much less certain is the expected salvage value to be realized upon disposal at the completion of the economic life of the vehicle. Recent experience of the Defense Property Disposal Office indicates that discarded government vehicles can be sold at auction at prices ranging from 25% to 40% of their original procurement cost. These figures include all vehicles 3/4 ton and below, both four wheel drive and standard two wheel drive. As heavier duty

vehicles with four wheel drive tend to command a greater price than the one-half ton two wheel drive pickups considered in this study, it is felt that the one-half ton pickup would tend toward the lower end of the spectrum. This conclusion is borne out by the experience of the GSA over the past three years which has shown that the resale value of these vehicles has been between 20% and 25% of the original cost. The actual realizable value of any given truck depends primarily upon its physical condition and outward appearance rather than any measurable parameter such as chronological age or accumulated mileage. For the purpose of this study, therefore, the realizable salvage value at the end of seven years will be assumed to be 20% of the initial provurement cost.

Tc provide a basis for projection of the cost of maintenance for one-half ton pickup trucks, data showing actual experience for a fleet of approximately 260 units at PWC San Francisco Bay for the first two quarters of FY77 was used. The costs of operating the transportation services at PWC San Francisco approximate the average experience cf the major shore commands in the 11th, 12th, and 13th Naval Districts. Furthermore, the inventory of equipment held by PWC San Francisco represents a sizeable proportion (roughly 10%) of the total Navy assets in the West Coast area. For these reasons and due to the diverse nature of the commands supported by PWC San Francisco, it is felt that costs incurred in vehicle operations there will be representative of those which can be expected by any large shore station in this area.

Analysis of the cost data indicates that the expected maintenance cost per mile varies with the total accumulated miles as shown in Figure 4.

| Accumulated Miles | Number of Vehicles | Maint Cost Per Mile ($) | Total Incl Fuel |
|---|---|---|---|
| 0-10,000 | 14 | .0999 | .1309 |
| 10-20,000 | 32 | .0615 | .0925 |
| 20-30,000 | 21 | .0781 | .1091 |
| 30-40,000 | 18 | .1065 | .1375 |
| 40-50,000 | 31 | .0778 | .1088 |
| 50-60,000 | 22 | .0889 | .1199 |
| 60-70,000 | 31 | .1144 | .1454 |
| 70-80,000 | 30 | .1277 | .1587 |
| 80-90,000 | 22 | .1325 | .1635 |
| 90-100,000 | 17 | .1949 | .2259 |
| 100-110,000 | 11 | .2210 | .2520 |
| 110+ | 9 | .0919 | .1229 |
| Total # Trucks | 258 | | |

Figure 4 - VEHICLE COSTS PER MILE

These costs include all materials and direct labor incurred through the period plus a 35% acceleration added to the direct labor for non-contributory fringe benefits. The mileage base used for comparison of these costs was the actual mileage the vehicle was operated during the period. The relatively high cost per mile experienced in the new vehicles, those with less than 10,000 accumulated miles, is attributable to the initial acceptance inspections and minor adjustments made during this period. The peak during the 30,000 - 40,000 accumulated mileage period is indicative of the typical large one-time repairs expenditures during this period such as extensive brake work, drive train repairs, suspension and exhaust system repairs.

As the average quarterly mileage utilization of the trucks in each mileage category is relatively equal, it is felt that the cost function is not biased by differences in utilization. It is felt that these cost per mile figures fairly represent the maintenance costs which can be expected throughout the life of a typical pickup truck as miles are accumulated. The average Navy pickup truck is operated approximately 10,000 miles in a given year. This study will assume that each Navy owned pickup truck will be operated 10,000 miles per year at an average cost per mile as shown in Figure 3 for its accumulated mileage category. Using techniques of regression analysis, based upon downtime records of PWC San Francisco, it is found that ownership of 27 vehicles is required if availability of 25 vehicles is to be assured. Accordingly, 270,000 annual vehicle miles will be used for determining the total cost of each of the alternatives.

Cost of operations on a per mile basis is primarily the cost of fuel. Other operating costs such as tires, oil, etc. are relatively insignificant. Present new trucks in

the PWC San Francisco fleet are travelling 16 mpg on fuel which cost $0.50 per gallon, thereby providing a fuel cost of $0.031 per mile. For the purposes of this economic analysis, new vehicles will be assumed to travel 16 miles per gallon also.

The total cost of ownership of a fleet of 27 one-half ton pickup trucks can now be calculated using present value analysis. Operating costs incurred throughout the year are assumed to occur in lump sum at the mid point of the year. Figure 5 shows that the cost of ownership is $105,305 net investment cost plus $164,640 net operating and maintenance cost for a total net present value of $269,945.

CAPITAL INVESTMENT COST

ORIGINAL PROCUREMENT

| | |
|---|---|
| 27 trucks @ $4346 | $117,342 |
| Less salvage 27 (4346)(.2)(0.513) | (12,037) |
| | $105,305 |

OPERATIONS & MAINTENANCE (TOTAL MI/YR = 27 x 10,000 = 270,000)

| | MILES | | CPM | | PVFACTOR | | NPV |
|---|---|---|---|---|---|---|---|
| 1st year | 270,000 | x | .1309 | x | 0.954 | = | 33,717 |
| 2nd year | 270,000 | x | .0925 | x | 0.867 | = | 21,653 |
| 3rd year | 270,000 | x | .1091 | x | 0.788 | = | 23,212 |
| 4th year | 270,000 | x | .1375 | x | 0.717 | = | 26,619 |
| 5th year | 270,000 | x | .1088 | x | 0.652 | = | 19,153 |
| 6th year | 270,000 | x | .1199 | x | 0.592 | = | 19,165 |
| 7th year | 270,000 | x | .1454 | x | 0.538 | = | 21,121 |
| | | | | | TOTAL OPERATIONS/MAINT | | $164,640 |
| | | | | | TOTAL COST | | $269,945 |

Figure 5 - COST OF NAVY OWNERSHIP

## C. NET LEASE WITH GOVERNMENT MAINTENANCE

The second alternative for fulfilling the requirement for transportation is commercial lease with all maintenance and operations costs borne by the government. The primary advantage to this option is that it provides new vehicles every two (to three) years. As the vehicles will not be owned by the government, the initial inspections and minor break-in problems causing the characteristic high initial costs of operations will be assumed to be borne by the lessor. Therefore, it is assumed that the government can operate and maintain these leased vehicles for a cost equal to the second year cost shown in the previous section of $0.0925 per mile. Since the government is providing all maintenance and, therefore, absorbing all downtime, 27 trucks must be leased in order to insure availability of 25. As several contracts of this nature are currently in force at Navy installations in California, their average monthly cost will be used for the purpose of this analysis. This cost is $105 per month, as shown in Figure 3.

Figure 6 shows the cost of the leasing alternative for the seven year period is $173,774 for leasing costs plus $127,572 for maintenance, for a total net present value of $301,346. Expected savings in maintenance are realized ($127,572 vice $164,640 for Navy ownership), but these savings are more than offset by the considerable increase in the lease cost over procurement costs ($173,774 vice $105,305. for ownership).

## FIXED RENTAL COSTS

$\$105/MO \times 12 \frac{MO}{YR} \times 27 = \$34,020$

| | | | PV FACTOR | | NPV |
|---|---|---|---|---|---|
| 1st year | $34,020 | x | 0.954 | = | $32,455 |
| 2nd year | 34,020 | x | 0.867 | = | 29,495 |
| 3rd year | 34,020 | x | 0.788 | = | 26,808 |
| 4th year | 34,020 | x | 0.717 | = | 24,392 |
| 5th year | 34,020 | x | 0.652 | = | 22,181 |
| 6th year | 34,020 | x | 0.592 | = | 20,140 |
| 7th year | 34,020 | x | 0.538 | = | 18,303 |
| | | | | | $173,774 |

## OPERATIONS COST

270,000 VEH. MILES (.0925) = 24,975

| | | | | | |
|---|---|---|---|---|---|
| 1st year | 24,975 | x | 0.954 | = | $23,826 |
| 2nd year | 24,975 | x | 0.867 | = | 21,653 |
| 3rd year | 24,975 | x | 0.788 | = | 19,680 |
| 4th year | 24,975 | x | 0.717 | = | 17,907 |
| 5th year | 24,975 | x | 0.652 | = | 16,284 |
| 6th year | 24,975 | x | 0.592 | = | 14,785 |
| 7th year | 24,975 | x | 0.538 | = | 13,437 |
| | | | | | $127,572 |
| | | | TOTAL COST | | $301,346 |

Figure 6 - COST OF LEASE WITH GOVERNMENT MAINTENANCE

## D. LEASE FROM GSA

A second available source of lease available to the Navy is the GSA interagency motorpool. GSA rental rates vary somewhat between areas, but are generally significantly less than the rates of commercial lessors. The current rate in California for a one-half ton pickup is $47 per month plus $0.090 per mile, Reference 4.

Since new vehicles would have to be purchased by GSA in order to fulfill a Navy lease requirement, procurement costs are considered irrelevent in this comparison, and the cost of leasing a vehicle from GSA will be compared only with the cost of maintaining and operating Navy owned vehicles.

Since GSA virtually assures the availability of a replacement vehicle when the assigned vehicle is returned for maintenance, only 25 vehicles will be leased from GSA in this economic analysis.

Figure 7 shows that the net present value of the cost to the Navy of leasing 25 vehicles from GSA for seven years is $196,147, as compared to the $164,640 cost of operations and maintenance under the Navy ownership option.

## GSA LEASE COST

RENTS - $47/MO x 12 MO/YR x 25 = 14,100

MILEAGE - 270,000 MILES x .090 = 24,300

$38,400

| | | | PV FACTOR | | NPV |
|---|---|---|---|---|---|
| 1st year | 38,400 | x | 0.954 | = | $36,634 |
| 2nd year | 38,400 | x | 0.867 | = | 33,293 |
| 3rd year | 38,400 | x | 0.788 | = | 30,259 |
| 4th year | 38,400 | x | 0.717 | = | 27,533 |
| 5th year | 38,400 | x | 0.652 | = | 25,037 |
| 6th year | 38,400 | x | 0.592 | = | 22,733 |
| 7th year | 38,400 | x | 0.538 | = | 20,659 |
| | | | TOTAL COST | | $196,147 |

Figure 7 - COST OF GSA LEASE

## E. FULL SERVICE MAINTENANCE LEASE

A final alternative to consider for providing suitable transportation is commercial leasing with all maintenance provided by the lessor. Under this option, the lessor is totally responsible for insuring the availability of the vehicles, so that only 25 vehicles need be leased.

The greatest potential for savings from the application of this form of lease lies in new installations which have no initial investment in the tools, equipment and skilled mechanics required for a maintenance shop.

A slightly different approach is used to compare ownership with this form of lease, due to the absence of valid actual cost data in the State of California. Using the formula given below for the capital recovery factor(CRF), a uniform series of cash flows with a present value equal to the total life cost of Navy ownership can be calculated, where i is the discount rate and n is the total number of periods.

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

Applying this formula for a period of seven years (84 months) and subtracting the present value of the fuel costs, which would be borne by the Navy in either case, provides a breakeven monthly payment of $151.

$$\left\{\begin{matrix}\text{Breakeven Monthly Payment (BMP)}\\ \text{for Full Service Maintenance}\\ \text{Lease of 25 vehicles}\end{matrix}\right\} = \left\{\begin{matrix}\text{Cost of Navy}\\ \text{Ownership}\end{matrix}\right\} \times \text{CRF} - \left\{\begin{matrix}\text{Fuel}\\ \text{Cost}\end{matrix}\right\}$$

CRF(i=0.00833 per month; n=84 months) = 0.01660

BMP = $269,945 x 0.01660 - .031(270,000)/12 mo.

BMP = $151.34

The implication is that if a lease contract can be consummated for less than $151 per month per vehicle including maintenance, the Navy would be better off to lease than to buy. The additional savings in overhead costs, which are probable with the lease option, make leasing attractive even if the cost is slightly in excess of the $151 calculated.

The following leases currently exist with lease costs of this order of magnitude (Figure 3):

1. NTS Keyport, Wash. 12 month lease
   10 each 3/4 ton pickup trucks
   $128.50 per month plus $.054 per mile in excess of 1,200 average miles/vehicle.

2. OICC Trident Bremerton, Wash. 24 month lease
   1 each 3/4 ton, 6 passenger pickup
   1 each 3/4 ton, 4x4 pickup
   $158.60 per month, no extra mileage charge

3. OICC Trident Bremerton, Wash. 24 month lease
   14 each 1/4 ton, 4x4 utility trucks
   $160.40 per month, no extra mileage charge

This alternative would therefore seem to have promise for further study.

The preceeding analysis has provided insight into the probable cost of providing transportation services for a seven year period under each of the alternatives. These cost estimates are based upon the operation of the average Navy vehicle and therefore are valid for comparison only for a program intended to lease an entire fleet of vehicles. On this basis it is found that continued Navy ownership is less costly than either leasing from the General Services

Administration or leasing vehicles from commercial sources while continuing to provide government maintenance. The alternative of leasing vehicles from commercial sources with maintenance provided by the lessor becomes less costly than Navy ownership if this service can be contracted for at a fixed monthly cost of less than $151. A recapitulation of the present value of all alternatives is shown in Figure 8.

ALTERNATIVE I
NAVY OWNERSHIP (see Figure 5)

| | |
|---|---|
| Procurement | $105,305 |
| O & M | 164,640 |
| Total | $269,945 |

ALTERNATIVE II
NET LEASE WITH GOVERNMENT MAINTENANCE (see Figure 6)

| | |
|---|---|
| Fixed lease cost | $173,774 |
| O & M | 127,572 |
| Total | $301,346 * |

ALTERNATIVE III
GSA LEASE (see Figure 7)

| | |
|---|---|
| Lease cost | $196,147 ** |

ALTERNATIVE IV
FULL SERVICE MAINTENANCE LEASE

| | |
|---|---|
| Breakeven monthly payment | $151.34 *** |

* Directly comparable to total cost of Alt. I
** Directly comparable to O & M cost of Alt. I
***Exactly equal to total cost of Alt. I if 25 vehicles are leased for 7 years and operated an average of 10,000 mi/yr/vehicle

Figure 8 - NET PRESENT VALUE SUMMARY OF THE ALTERNATIVES

## VI. SHORT TERM APPLICATIONS

Leasing has often been cited as being an excellent method of solving short term transportation problems. As leases are generally made for two years but can be made for shorter durations, they are uniquely useful in providing a means for obtaining vehicles for relatively short peak requirements, and for providing a viable alternative to the high one-time cost of a major overhaul late in the life of the vehicle. One other application of leasing is of interest to the manager of a local command who has no money for procurement and therefore has only the choice of maintaining existing equipment, leasing vehicles or doing without. As long as the variable cost of operating a leased vehicle is less than the variable cost of operating existing government owned equipment, the cost of leasing will become less than the cost of continued ownership at some level of operation measured in miles driven during a given month. As the vehicles in a government owned fleet begin to accumulate mileage, becoming more and more costly to operate on a per mile basis, it is incumbent upon the local manager to recognize the situation and take action to minimize his costs.

In addition, for those few vehicles which are in extremely high mileage service such as security vehicles and taxis, the monthly cost of operating even a relatively new government owned vehicle can exceed the cost of leasing this vehicle. To assist the local manager in recognizing the savings to be realized from this application of leasing, Figure 9, displays the required monthly mileage at which the various forms of leasing become less costly than ownership,

assuming current costs per mile for operating government typical of those experienced at PWC San Francisco. For example, if the present cost to operate Navy-owned vehicles is $0.14 per mile, leasing from GSA would be cost effective if monthly mileages exceed 940 miles.

Three of the vehicles from the PWC San Francisco motorpool accumulated in excess of 3,000 miles per month over a period of six months. It can be seen that only with trucks in the 10,000-20,000 accumulated mileage group is the cost of ownership less than $.10 per mile. As these high mileage vehicles are most likely security vehicles with installed special equipment such as radios, siren, and emergency lights, the costs of changing vehicle assignments to insure utilization of only these cost effective vehicles would exceed any savings to be realized. Vehicles with this sort of heavy utilization should be leased from GSA or from commercial vendors with maintenance provided by the lessor. Further, for vehicles exceeding the assumed economic life of 70,000 miles, the cost per mile of operation quickly reaches a point where leasing becomes cost effective even for vehicles of only average utilization of 800 miles per month. An added benefit of this sort of selective leasing is that it frees remaining assets for more moderate utilization thus keeping them below the 70,000- 80,000 mile criterion for a longer period of time. It is felt that current levels of procurement could succeed in maintaining a government owned fleet below the accumulated mileage criterion dictated by policy if this selective leasing were pursued.

| BREAKEVEN MONTHLY MILEAGE | | | | | |
|---|---|---|---|---|---|
| Present cost per mile of Navy ownership | Commercial lease with Navy maint. $105 + $.0925/mi. | GSA lease $47 + $.090/mi. | Commercial lease w/full maint. | | |
| | | | $150/mo. | $175/mo. | $200/mo. |
| $0.10 | 14,000 | 4,700 | 1,500 | 1,750 | 2,000 |
| $0.12 | 3,818 | 1,566 | 1,250 | 1,458 | 1,667 |
| $0.14 | 2,211 | 940 | 1,071 | 1,250 | 1,429 |
| $0.16 | 1,556 | 670 | 938 | 1,094 | 1,250 |
| $0.18 | 1,200 | 522 | 833 | 972 | 1,111 |
| $0.20 | 977 | 427 | 750 | 875 | 1,000 |
| $0.22 | 824 | 362 | 682 | 795 | 909 |
| $0.24 | 712 | 313 | 625 | 729 | 833 |

Figure 9 - BREAKEVEN MONTHLY MILEAGE

## VII. VIEWS FROM THE SAN DIEGO EXPERIENCE

A true test of a concept is how effectively it works in the field when it is implemented. During July 1977 the authors visited the Public Works Center at San Diego, California, where the leasing of 11% to 12% of their entire fleet of almost 1400 vehicles has been in effect since 1973. This rather small percentage of leased vehicles accounts for over 27% of the total vehicle mileage generated at San Diego. Discussions were held with members of the PWC staff representing executive management, contract administration and transportation operations. In addition, interviews were taken with Kennedy Services, Incorporated (the commercial firm presently leasing all the vehicles to the Public Works Center), and with a major user of the leased vehicles, the Security Department of the San Diego Naval Base.

The Transportation Department of the PWC San Diego underwent a Navy Inspector General inspection in early 1977. A presentation booklet was prepared by the PWC for this inspection and the specific section dealing with vehicle leasing is included in this research as appendix A. The background of their leasing program, the present extent of their leasing effort and a summary of their experiences are all contained in this appendix. The 1975 leasing contract for 34 pickups at $104.15 per vehicle per month expired in early 1977 and a new contract was awarded on 3 May 1977 for 34 new pickups at $104.11 per vehicle per month. There were five bidders on the contract.

The PWC Production Officer, CDR. James Doebler, CEC, USN and the Transportation Department Head, Mr. Al Kehoe,

expressed complete satisfaction with the leasing concept. Leasing has reduced operating costs by assigning new leased vehicles to the higher mileage requirements and the Government owned vehicles to the remaining lower mileage requirements. The PWC San Diego is presently reporting the lowest vehicle operations costs of the nine PW Centers and this is due in a large measure to the two year leasing of new pickup trucks for high mileage requirements, such as the Security Department, San Diego Naval Base.

The PWC Transportation Maintenance Shop personnel are pleased with the results of the leasing program. First, the leased vehicles are in the shop far less often than the older Navy vehicles with similar accumulated mileage, due to the fact they are new and covered by the factory warranty for their first year. Second, having the newer leased vehicles in service enables the PWC to survey, or retire, the very old high mileage vehicles from its Navy owned fleet for which parts are difficult to obtain and which are in such poor condition that they would be continually in the shop. As a result, the remaining Navy owned trucks, even those with extremely high mileage, can be operated at a lower cost per mile and can be kept on the road a higher percentage of the time due to greater availability of mechanics.

Figure 10, deriven from transportation cost reports from PWC San Diego, shows the cost of maintenance for the Navy owned one-half ton pickup fleet at PWC San Diego for the identical time period used to determine the PWC San Francisco cost of operation. The maintenance costs closely coincide for vehicles with accumulated mileage less than 90,000 miles. The dramatic divergence of the cost of maintenance for older trucks (greater than 90,000 miles) is indicative of the effectiveness of the leasing program. The average maintenance cost for the leased vehicles during this

period was found to be $0.040 per mile.

| Accumulated miles | PWC San Diego # of vehicles | PWC San Diego cost per mile | PWC San Francisco # of vehicles | PWC San Francisco cost per mile |
|---|---|---|---|---|
| 0-10,000 | 29 | .0660 | 14 | .0999 |
| 10-20,000 | 29 | .0635 | 32 | .0615 |
| 20-30,000 | 48 | .0868 | 21 | .0781 |
| 30-40,000 | 37 | .1098 | 18 | .1065 |
| 40-50,000 | 54 | .1053 | 31 | .0778 |
| 50-60,000 | 61 | .1298 | 22 | .0889 |
| 60-70,000 | 45 | .1222 | 31 | .1144 |
| 70-80,000 | 50 | .1282 | 30 | .1277 |
| 80-90,000 | 52 | .1330 | 22 | .1325 |
| 90-100,000 | 26 | .1157 | 17 | .1949 |
| 100-110,000 | 30 | .1269 | 11 | .2210 |
| 110+ | 30 | .0741 | 9 | .0919 |
| | 491 | | 258 | |

Figure 10 - COMPARISON OF MAINTENANCE COSTS BETWEEN PWC SAN DIEGO AND PWC SAN FRANCISCO

The PWC Contract Administration Staff headed by LCDR Thomas Michna,CEC, USN with Mrs. Pat Mancuso as the Senior Contract Administrator, has experienced few problems in the administration of the leasing contract. "It is probably the easiest services contract that we handle", Mrs. Mancuso stated. This staff prepares the contract documents, issues the Invitation for Bids, holds the bid opening and awards the contract to the lowest responsible and responsive bidder. The contractor delivers the vehicles to the PWC Transportation Department which has the physical control and responsibility of the vehicles during the life of the contract. The Transportation Department provides a monthly memorandum to Contractors listing each leased vehicle and the number of days it is actually in the Government's control. This forms the basis for the monthly partial payments to the contractor.

An expense factor to be considered in the total cost to the Government of leased vehicles is the costs above and beyond "normal wear and tear." There are two aspects to this point.

1. If the vehicle is wrecked or suffers major damage not covered by the factory warranty or lease provisions, the Government must resolve and pay the fair dollar value of the damage to the contractor.

2. At the close out of the leasing contract at the end of its normal two years, the vehicles are required to be returned to the contractor in good operating condition less 'normal wear and tear.'

The leasing contracts presently written by the Government do not adequately define the term "normal wear

and tear". It is recommended that a better definition be developed and inserted in the contracts, since this term is open to individual intrepretations by the parties to the contract.

Three different approaches have been utilized in the past to resolve this matter.

1. The first leasing contract in 1973 was with an out-of-state firm. The Contractor delivered the vehicles to the PWC San Diego and, at the end of the contract, hired an independent automobile appraisal firm to inspect each vehicle and submit a report on items above 'normal wear and tear'. This impartial third party report was considered acceptable to the Government and served as the basis for closing out the contract.

2. The second method utilized has been a joint inspection of each vehicle by representatives of the Government and the Contractor with on the spot resolution of differences.

3. The third method , a more formal version of the second, consists of the Contractor inspecting each vehicle and submitting a letter setting forth additicnal charges per vehicle.

The close out costs for the last two pickup truck contracts have been approximately $100 per vehicle, in addition to the cost of some maintenance items which the government elected not to repair prior to returning the 3vehicles to the contractor. Based upon a small sample of the PWC San Diego experience, one rule of thumb for close out costs might appear to be one month's vehicle lease rate per vehicle. This does not include major damages handled on a one-time basis.

Mr. Jim Kennedy, President of Kennedy Services, Inc. (the contractor for three separate leasing contracts with PWC San Diego), was interviewed and stated that from the contractor's viewpoint, the contract is fair and equitable with a reasonable profit at minimum risk. However, he felt that the contract provision permitting the Government to cancel the contract on 30 day's notice was unreasonable and that the contractors had to prepare their bids assuming that the contract would run for two years. If a contractor included the costs of potential termination in his bid, contract costs would be considerably higher. This risk to the contractor is magnified when the Navy leases specialized equipment with a limited market value outside the Navy. He advised that commercial leases provide for a minimum initial period of 12 months followed by a 60 day cancellation notice during the remainder of the contract.

Mr. Kennedy further advised that the Government could lease pickup trucks with several extra features for the same rate as the "Sally Rand's" (stripped models) currently being leased, due to the much higher resale price these delux pickups would command for the contractor upon the completion of the contract period. Desirable features that could be added include heavy duty suspension, cooling system and alternator as well as v-8 engines, automatic transmissions, power steering and brakes and a 3/4 ton body.

Mr. Kennedy is pressing the State of California for relief from the 6% sales tax he is charged on the new vehicles he provides to the Government. He purchases the vehicles directly from the manufacturer, Chrysler, and pays cash by arranging his own financing. He receives a $50 to $100 factory rebate based upon the number of vehicles he puts in service per year. His contention is that the vehicles are for a Government contract and should not be taxed, whereas, California views the vehicles as the

property of Kennedy Services and hence subject to taxation. The Government contract states that the contractor is liable for appropriate licensing and taxes by the State of California, and the U. S. Navy has therefore remained out of this issue. Should relief be obtained, however, these savings would be passed to the Navy in the form of reduced rates.

A survey was made of 12 personnel from the Security Department, San Diego Naval Base, as they brought their pickup trucks in for gasoline. To the man, they felt that Security was receiving a newer vehicle, in better operating condition and with a higher degree of reliability. The customer image of the leasing program was most positive. The satisfaction expressed by the Security Department personnel was most evident in their enthusiasm for the leasing program.

In summary, the views from the field reflected a high degree of satisfaction from all the individuals involved in the leasing program. The leasing concept is implemented at PWC San Diego and is working well.

# VIII. SUMMARY AND CONCLUSIONS

When considering the alternatives of lease versus ownership from the standpoint of the expected present value of the total life costs of providing the 25 operable vehicles assumed in this study, Chapter 5, it appears that no cost savings can be realized by DOD from leasing if the DOD vehicles are operated no longer than seven years/70,000 miles.

However procurement practice in the past decade has resulted in an older vehicle fleet with a much higher mileage profile than written policy dictates. The resulting high costs of vehicle maintenance make leasing on a selective basis a viable alternative to continued operation with the aging fleet. It is far better to lease a vehicle in these situations than to attempt to keep a vehicle on the road after it has exceeded its useful life. At the level of 25 available pickup trucks assumed by this study, savings realized by DOD ownership, when compared to either commercial lease with maintenance provided by the government or lease from the General Services Administration interagency motorpool, were almost exactly equivalent (approximately $31,500 over seven years). This observation leads one to conclude that GSA operation of a fleet of vehicles provides no savings over simple commercial outleasing if vehicles are operated only 10,000 miles per year. Figure 8 provides a net present value summary of the various alternatives.

Commercial leasing with maintenance provided by the lessor provides the most promising alternative to government

ownership. If the lease can be obtained at a fixed monthly cost (no additional cost per mile) of less than $151 per month, this alternative becomes less costly than government ownership. As this figure compares favorably with the few leases of this form now in force, it is felt that further study should be made of this option taking into account the expected savings in overhead to be realized. This further study is of paramount importance for new installations ,such as NAVSUBASE Bangor, where fixed overhead costs have not yet been incurred and are therefore avoidable.

A true test of a concept is how effectively it works in the field when it is implemented. Beginning in 1972, the Navy has been leasing between 11% and 12% of their vehicle requirements in the San Diego area. The leasing contract, administered by the Public Works Center, San Diego, has been rated a success by both the staff of the transportation program and the users of the vehicles. Leasing was justified based upon the advancing age and condition of the vehicle fleet and the large number of customers with high mileage requirements, i.e., security, taxi service, messenger and delivery runs and vehicle pool operations. Leasing has reduced the maintenance and operations costs for these high mileage vehicle requirements while providing newer vehicles to the users. Although only 11.6% of the total fleet, these leased vehicles have operated approximately 27.5% of the vehicle miles. This permits the assignment of older government owned vehicles to the lower mileage requirements thereby lowering their monthly maintenance and operations costs also. The leasing concept has been in practice for five years at San Diego and is working well with a high degree of satisfaction expressed by all the parties involved.

It should be noted that an implicit assumption of this study has been that private industry would expand to meet

the increased demand of a Government policy change resulting in significant increases in the level of leasing. Furthermore, any large scale change in this direction would constitute significant stimulus to the economy which could have profound long-term effects. Investigation of these effects is beyond the scope of this analysis. However, the implications to the automobile manufacturing, leasing and used car industries are obvious and require much closer scrutiny than can be provided by this study.

# APPENDIX A

# VEHICLE LEASING AT PWC SAN DIEGO

## A. BACKGROUND

Lagging Navy vehicle procurement from the late 1960's to the present has brought about several undesirable conditions. First of all, maintenance cost per mile has substantially increased due to the necessity to keep overaged and over mileage equipment on the road.

Second, downtime commonly increased beyond the NAVFAC 7% operating criteria. In essence the increase in downtime provides the user with only a part of a vehicle since a significant amount of its total available time is spent in the shop rather than in use.

Third, the reliability of the equipment became questionable. It was not unusual for a job to be aborted or delayed due to equipment breakdown.

The Navy Public Works Center, San Diego, recognized these problems and in 1972 sought a solution to the austere procurement outlook. An extensive analysis was undertaken to analyze costs of old equipment vs new, identify high mileage users, and determine if leasing could provide a partial sclution to the problem.

Pre-experience estimates indicated that on the average, leasing was cost effective in those areas when mileage was 1,800 miles per month or more. Consequently in April of 1973, 52 one-half ton pickups were leased to absorb the high mileage users (in general those in security service) and in October of 1973 an additional 89 vehicles were leased after an analysis indicated other equipment codes which could benefit from vehicle leasing. These codes consisted of sedans, six-passenger pickups, carryalls, panels, and stake trucks.

Subsequent contracts have made the following additions and/or deletions:

a. The original contract for 52 one-half ton pickups was revised to 34 for the next contract. This was due to increased government procurement and a significant increase in lease costs.

b. The original contract for 89 vehicles was revised to 97 vehicles. The increase was due to the utilization of compact sedans in security service. Previously this service has been provided with pickups.

c. A new contract was established for 31 leased units that were to be placed in service upon consolidation with Public Works Department at Naval Air Station, North Island.

## B. LEASED ASSETS

At present the following leased units are in operation:

a. Contract #N62474-75-C-3447
   Contractor: Kennedy Services International
   Provides: 34 each one-half ton pickup trucks

b. Contract #N62474-75--C-3621
   Contractor: Kennedy Services International
   Provides: 29 each compact sedans
   24 each panel trucks
   30 each twelve passenger carryalls

8 each one ton stake trucks
6 each six passenger pickups

c. Contract #N62474-76-C-8739
Contractor: Kennedy Services International
Provides: 15 each one-half ton pickups
7 each six passenger pickups
3 each one ton stake trucks
4 each carryalls
2 each forward control panels

The table below provides a total inventory of leased and government vehicles by type to show the percentage of inventory leased vehicles represent.

| Type Vehicle | Total Vehicles | Quantity Leased | % of Total |
|---|---|---|---|
| Sedans | 332 | 29 | 8.7 |
| 1/2 ton pickup | 530 | 49 | 9.2 |
| Six pass pickup | 150 | 13 | 8.7 |
| Panel trucks | 108 | 26 | 24.1 |
| Carryalls | 134 | 34 | 25.4 |
| Stake trucks | 139 | 11 | 7.9 |
| Total | 1393 | 162 | 11.6 |

C. UTILIZATION

One of the key factors in ensuring economic benefits of leasing is high mileage generation by the leased units. By doing this, the low maintenance miles are "skimmed" from the leased units and the government owned units operate efficiently over a longer number of years. The table below provides an illustration of how the leased units at PWC San Diego represent a far greater portion of the mileage

generated than they do of the total inventory.

| Type Vehicle | % of Inventory | % of Mileage |
|---|---|---|
| Sedan | 8.7 | 33.1 |
| Pickup | 9.2 | 22.9 |
| Panel Van | 24.1 | 51.2 |
| 6 Pass Pickup | 8.7 | 11.7 |
| Carryall | 25.4 | 37.8 |
| Stake Truck | 7.9 | 10.4 |
| Average | 11.6 | 27.5 |

The above table indicates that the leased vehicles are averaging approximately 2.4 times the mileage received by their government ccunterparts.

D. EXPERIENCE

The general findings of operating and maintaining leased vehicles versus the older government-owned ccunterparts have revealed two significant factors. First of all , the operations and maintenance costs have generally been about $.095/mile less with leased vehicles. Since present average lease cost is about $110/month, the approximate mcnthly breakeven mileage to make leasing economical can be calculated to be 1,150 miles/month. This varies with individual equipment type but holds true as a general rule.

Second, the downtime experienced with leased vehicles has been markedly lower than that of the older government fleet. Dcwntime figures have indicated 2.6% for the leased vehicles vice 5.9% for the government fleet. This means that the 162 leased vehicles are providing the same available service as 167.3 (162 x 1.033) government

vehicles.

Another factor, while not a cost or availability benefit, is the ability to order equipment not normally provided by government procurement. By utilizing local contracts, such items as automatic transmission, heavy duty suspension, heavy duty cooling system, etc., can be specified. In many cases, the addition of these features can reduce maintenance and/or provide better service. In essence, the vehicle can be tailor-ordered to fit the job it performs.

# LIST OF REFERENCES


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